United States Department of Agriculture | **Forest Service** | **Southwestern Region Forest Health Arizona Zone Office** | **2500 S. Pine Knoll Drive Flagstaff, AZ 86001-6381 FAX (928) 556-2130 Voice (928) 556-2073**

File Code: 3420 **Date:** November 1, 2005
Route To:

Subject: Bark Beetle Activity at Bald Mesa WUI Project Area (mogollonrimrd)

To: District Ranger, Mogollon Rim Ranger District, Coconino NF

On September 28, 2005, I traveled to Happy Jack to meet with Bruce Koyiyumptewa, District Silviculturist, to assess the proposed Bald Mesa Wildland Urban Interface (WUI) project area on the Mogollon Rim RD, Coconino NF. I describe in this report the proposed restoration project, summarize bark beetle activity within the project area, and make recommendations to minimize bark beetle impacts associated with project treatments.

Bald Mesa WUI project area

The Mogollon Rim Ranger District, in collaboration with local homeowners has proposed to reduce fuels in the Wildland Urban Interface (WUI) around Units 1 and 2 of the Clear Creek Pines subdivision. The project area is located approximately 47 miles southeast of Flagstaff, Arizona, adjacent to the Lake Mary Highway. The total project area would prescribe burn 4,500 acres and implement a thin from below treatment on 1,000 acres to restore forest health and reduce the wildfire risk to the Clear Creek Pines Communities.

The District has submitted a proposal for Forest Health Protection restoration funds to implement the Bald Mesa WUI Project. The funds will be used to implement the thin from below treatment on 186 acres of ponderosa pine stands adjacent to the Clear Creek Pines Community #2. Ponderosa pine stands within this area are comprised of clumps of large diameter yellow pine and dense stand of smaller diameter pine (blackjacks) (***Figure 1***).

The thin from below treatments would reduce tree densities from about 1,200 stems per acre to about 115 trees per acre or from about 200 sq. ft. of basal area per acre to about 40 to 50 sq. ft. per of basal area per acre. The created thinning slash will be a lopped to a 24 inches height and scattered and burned when the created slash cures. The District will work to mimic the historic "clumpiness" of larger diameter pines (3 to 14 yellow pines per clump).

Project objects include:

1. Protecting clumps of Old Growth (yellow pines) from fire and bark beetle-caused impacts
2. Restoring stand conditions that support desirable fire behavior
3. Reducing ground and ladder fuels to change future fire behavior that decreases rate of spread and intensity
4. Restoring a mosaic of vegetation to enhance species diversity

A walkthrough survey of these units by Bruce and me found that western pine beetle (*Dendroctonus brevicomis*) was responsible for most of the bark beetle-caused mortality of ponderosa pine (***Figure 2***). This beetle in general prefers to attack large diameter ponderosa pine

(DeMars and Roettgering 1982), or it may infest the lower bole of trees initially attacked by pine engraver beetles (*Ips pini* or *Ips lecontei*), that occur in dense stands.

Pine engraver beetles did not appear to be currently a problem within project area. However, caution should be used to minimize the build up of these beetles especially because of the proximity to adjacent private lands.

Figure 1. *Forest stand conditions adjacent to the Clear Creek Pine subdivision.*

Figure 2. *Forest stand conditions near Clear Creek Pines subdivision*

Recommendations

The proposed restoration project within the Wildland Urban Interface of the Clear Creek Pines subdivision will reduce the overall susceptibility of stands and individual trees to bark beetle attack in the long term, lessen risk of catastrophic wildfire, and improve vegetative species diversity. For prevention of western pine beetle attacks in California, thinning of dense ponderosa pine stands is an effective silvicultural method for managers of both small and large holdings (DeMars and Roettgering 1982). DeMars and Roettgering (1982) state that by reducing stand stocking to 55 to 70 percent of the basal area needed for full site utilization will relieve the competitive stress among the residual trees, improve their vigor, and make them less prone to successful bark beetle attack. In addition, thinning from below has been experimentally demonstrated to increase the resistance level of the residual mature pine overstory (Feeney et al. 1998).

Thinning slash may pose a short-term risk to residual trees in the thinning units or surrounding areas depending on the timing of thinning, local population of pine engraver beetles, and site and environmental factors such as site quality and precipitation. Careful monitoring of beetle populations associated with these thinning projects should be implemented. Parker (1991) provides guidelines for minimizing pine engraver beetle impacts associated with thinning treatments.

In general, population increases of pine engraver beetle can be minimized by implementing thinning projects after the onset of the monsoon season through December. Cutting trees during this season will allow the material to partially dry out before beetles fly in the spring. Also, standing residual trees may be less susceptible during this time due to increased soil moisture caused by the monsoon rains. Slash generated from January through May typically remains moist and enhances beetle population increases. If this timing approach is being used, and trees are only lopped and left untreated on the site, there are a couple of points to consider. First, slash generated on more exposed areas that have relatively low residual basal area will likely dry out more by the time beetles fly in the spring. Second, on steeper slopes or where the residual basal area is still relatively high, slash may not adequately dry out by the time beetles fly in the spring.

Another general "rule of thumb" approach to preventing pine engraver beetles from impacting areas where thinning projects are being implemented is to separate project areas in time and/or in space. Beetle populations probably will remain relatively low if thinning projects are conducted every other year. Similarly, a buffer of over 2 miles between management sites is also thought to prevent mass movement of beetles from one area to another. This is important information to keep in mind for ongoing thinning treatments in the Bald Mesa area, especially if an additional acres are to be treated beginning in 2007. If thinning treatments are implemented in consecutive years, there likely will be a buildup of pine engraver beetles that can move from one thinning project to the next. This scenario somewhat resembles an approach used in the northern Rocky Mountains where pine engraver beetles populations are regulated through "green chaining." As long as there is new and suitable slash, the beetles stay in this material and do not severely impact thinned stands. However, if the slash food supply is cut off, the beetles may move into standing trees. I would caution against this approach in Arizona, as there can be numerous factors that may result in the "breaking of the chain."

It will be important to keep an eye on the residual trees within areas to be thinned in the near future. If residual trees are observed to begin fading, prompt cutting and treatment of these trees will help to reduce the buildup of pine engraver and other bark beetle populations. However, using the slash management guidelines outlined above is a better preventive strategy.

Funds may be available for FY2006 from Forest Health Protection to deal with bark beetle activity. Requests for these funds should be in no later than October 15, 2005. Please have your staff contact our office if funding will be requested.

If you have any questions regarding my assessment of bark beetle activity within the project area, its potential effect on residual standing trees, or my recommendations, please let me know. I can be reached at (928) 556-2074.

/s/ Joel D. Mcmillin
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